Impact Of Health Education On Hba1c Level Among Diabetic Patients in Al-Qassim Region, Saudi Arabia.

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مرد وأثر التثقيف الصحي على مستوى ونسبة السكر التراكمي بين مرضى السكري في منطقة القصيم، المملكة العربية السعودية

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ملخص:

الهدف

الهدف من هذه الدراسة هو تقييم أثر التثقيف الصحي على مراقبة نسبة السكر في الدم لدى مرضى السكري الذين يتابعون في مراكز الرعاية الصحية الأولية في منطقة القصيم.

آلية البحث

أجريت دراسة تجريبية في تسعة مراكز للرعاية الصحية الأولية في منطقة القصيم لتقييم أثر التثقيف الصحي على مستويات نسبة السكر التراكمي وتم جمع نتائج عينات نسبة السكر التراكمي (HbA1c) لكل مريض أثناء المسح الأساسي، ثم أجري التثقيف الصحي لمرضى السكري من كلا الجنسين الذين يتابعون في مراكز الرعاية الصحية الأولية ثم بدأنا المسح النهائي بعد أربعة أشهر من التثقيف الصحي، في هذه الأثناء سجلنا نتائج العينة الثانية من نسبة السكر التراكمي ووضعنا نسبة 7٪ أو أقل كحد أدنى للسيطرة على داء السكري.

وقد أجريت الدخول وتحليل البيانات باستخدام الحزمة الإحصائية للعلوم الاجتماعية (الإصدار 17 لنظام التشغيل ويندوز)، وتم تحديد الفروق ذات الدلالة الإحصائية، والمقارنة بين المجموعتين.

النتائج

كان العدد الفعلي من المستهدفين في الدراسة431 في المسح الأساسي و 418 في المسح النهائي؛ الرجال (50.7٪) و (49.3٪) من النساء. ليس هناك فرق كبير في البيانات الديمغرافية، عدا البيانات التي وردت التثقيف الصحي؛ 82.4٪ في المسح الأساسي، و87.8٪ في المسح النهائي P <0.017.

فيما يتعلق بالسيطرة على مرض السكري وفقا لنسبة السكر التراكمي، هناك فرق ذات دلالة إحصائية في مجموعة المسح النهائي: الذكور(P <0.001) ، الإناث(P 0.002) . وهناك أيضا فرق ذات دلالة بين المجموعتين فيما يتعلق في: السن والتدخين واتباع نظام غذائي صحي ، وتناول التمر وتقليل تناول الدهون وزيادة تناول الخضار وتناول المشروبات الغازية (P <0.001). والسبب في هذا التحسن يرجع إلى نصح الطبيب وادراك المرضى لأهمية الاهتمام بصحتهم (P <0.001) . لكن لم يكن هناك ادراك كافي بشأن زيادة الوزن في المسح النهائي (P 0.574) . لم يكن هناك فرق ذات دلالة بين المجموعتين في المستوى التعليمي، والتاريخ العائلي لأمهات يعانون من مرض السكري وكذلك تناول الحلويات والمعجنات . لكن كان هناك فرق ذات دلالة بين المسح الاساسي والمسح النهائي في متوسط نسبة السكر التراكمي (P< 0.001) .

الخلاصة

تطوير نوعية التثقيف الصحي في مراكز الرعاية الصحية الأولية يعمل على تحسين الوعي والممارسات والسيطرة على المرض بين المرضى الذين يعانون من داء السكري. وينبغي إشراك طلاب الطب في أنشطة التثقيف الصحي للمجتمع للتوعيـــــة في المشاكل الصحية ذات الصلة، وهناك حاجة لإجراء المزيد من البحوث على نطاق واسع في هذا المجال.

الكلمات الدالة: التثقيف الصحي؛ داء السكري؛ نسبة السكر التركمي؛ القصيم – السعودية.

Abstract:

Aim:

The aim of this study was to assess the impact of health education on glycemic control among diabetic patients attending the Primary Health Care (PHC) Centers in Al-Qassim Region.

Methods:

An experimental study conducted in 9 PHC Centers in Qassim Region to assess the impact of health education on HbA1c levels. Samples of HbA1c were recorded for each patient at the time of the baseline survey, then health education was conducted to the diabetic patients of both sexes attending PHC Centers. We started the end-line survey after four months of health education, in the meantime we recorded the results of the second sample of HbA1c. We put HbA1c ≤7% as cut limit for the control of diabetes mellitus.

Data entry and analysis was carried out using SPSS (version 17 for Windows), we used cross-tabulation with Chi-squared test to detect statistically significant differences, and compare means between the two groups.

Results:

The actual number of completed interviews was 431 in the baseline survey and 418 in the end-line survey; men (50.7%) and (49.3%) women. There is no significant difference in the demographic data, except for those received health education; 82.4% in the baseline survey, and 87.8% at the end-line survey ($p < 0.017$) .

With regard to the control of diabetes mellitus according to HbA1c, there is statistically significant difference in the end-line group; gender, males ($p<0.001$), females (p 0.002). There is also a statistically significant difference in baseline and end-line survey; age, smoking, healthy diet, eating dates , decrease fat intake, increase vegetable intake, and diet soft drink intake ($p<0.001$). The reason for this improvement is due to doctor's advice and patients' awareness to his health ($p<0.001$), but the fear of increase in weight was not significant (p 0.574). It is not significantly different in the end-line survey; educational level, maternal family history of diabetes mellitus and sweets/cake intake. Compare means of HbA1c between baseline and end-line survey is significantly different $P<0.001$

Conclusions:

Improving the quality of health education in PHC Centers will improve the awareness, practices and control among patients with diabetes mellitus. Medical students should be involved in such activities of health education in the community related health problems and further research on a large scale in this area is needed.

Key words: health education; Diabetes Mellitus; HbA1c.

Introduction:

Diabetes mellitus (DM) is one of the most widely prevalent diseases, its incidence is increasing, recent estimates indicate that 366 million people aged 20-79 years have diabetes in the year 2011, this number is expected to reach 552 million by 2030. [1] The prevalence of diabetes in Saudi Arabia is of the highest, it had been estimated 30%. [2]

Saudi Arabia is a member of UNO and a signatory to HFA declaration, the public sector health system in Saudi Arabia saw a rapid expansion during the last three decades. [3] Health education is considered an essential component to improve knowledge and change behaviors, there is an evidence that people affected by the diabetes often have inadequate knowledge about the nature of diabetes, its risk factors and associated complications. This lack of awareness may be the underlying factor affecting attitudes and practices towards its care. [4] Patient self-management and education reduce the risk of these long-term complications. [5] This can be empowered with patient understanding of the nature of his disease and ability to practice a healthy lifestyle. [6, 7]

The PHC centers are considered the best place to provide health education to patients and the general population. All Saudi Citizens are registered in PHC and have family health records where they can receive all needed primary health care including management and follow up of diabetes mellitus. One of the main elements of PHC is health education, that must empower and motivate people to take informed decisions on the activities to ensure attainment of health. [8]

At the time of this experimental study there was a campaign of health education in PHC for diabetes and a running policy to monitor the impact of health education by measuring HbA1c every three months for all diabetics. Blood glucose level changes on a minute by minute basis, while HbA1c level changes very slowly over a 10 week period. [9] HbA1c below or around 7% has been shown to reduce microvascular and neuropathic complications of type 1 and type 2 diabetes. [10]

Methods:

This study was conducted between September 2012 and February 2013, a baseline survey after training PHC Center physicians, other staff and medical students. Four weeks before starting health education activities, a well constructed questionnaire translated into Arabic administered by the staff of the PHC Center and/or the medical students for each other diabetic patient (male or female) visiting the PHC Center, during this time we recorded the last reading for HbA1c for each patient. Our intervention comprised of contribution with training the PHC staff in health education techniques, and introducing health education sessions organized by the medical students in the PHC centers. The materials used in health education were brochures, booklets, and charts provided by the Ministry of Health, which were already available at the PHC centers. The primary focus of health education was on the risks associated with unhealthy diet, smoking, and physical inactivity. After 4 months of the start of the baseline survey we started the second line survey and recording the second reading of HbA1c.

In this study we put HbA1c < 7% an indicator for the control of diabetes mellitus. ADA recommended lowering HbA1c to below or around 7%. [10] NICE recommended HbA1c levels of between 6.5% and 7.5% for the control of diabetes mellitus. [11] Another study suggests HbA1c (7-7.5%) at the start of management and 7% can be accepted later on. [12]

Calculation of the sample size was based upon the assumption that uncontrolled HbA1c before health education as 40% (± 5%) and after health education as 30% (± 5%), which gave sample size 365 and 323 for pre and post education respectively. We increased it to 430

and 420 to account for the design effect, this number was distributed in between 9 PHC Centers in 4 cities in Qassim Region. Data entry and analysis was carried out using SPSS (version 17 for Windows), we used the frequency tables, cross-tabulation with Chi-squared test to detect statistically significant differences, and compare the means between the two groups.

Inclusion criteria: Saudi personnel who are resident of the Qassim Region attends PHC Center, eighteen years or over, suffer from diabetes mellitus and who agreed verbally to participate in the study.

Exclusion criteria: Non- Saudis, those below eighteen years years, not diabetics and those who did not agree to participate in the study.

Ethical approval Approval for conduction of this study was obtained from the Ethical Committee of Qassim University,- College of Medicine.

Results:

The 9 selected PHC Centers nearly achieved the assigned target of interviews before and after the intervention. The actual number of completed interviews; 431 in the baseline survey and 418 in the end-line survey, our sample comprised of (50.7%) men and (49.3%) women. The demographic data; age-group, marital status, education, maternal family history of diabetes mellitus are not significantly different. Those who received health education; the baseline survey 82.4%, and 87.8% at the end-line survey (p <0.017) (Table 1).

Table (2) shows statistically significantly different in the control of diabetes mellitus in the baseline survey and end-line survey. This glycemic control of diabetes is according to the test result HbA1c (7%). Results concerning the glycemic control according to gender; males (p<0.001), females (p 0.002). In the items of; age, smoking, healthy diet, eating dates, decrease fat intake, increase vegetable intake and diet soft drinks (p<0.001). Item of reasons for change after health education; doctor's advice and health care (p<0.001), but the fear of increase weight (p 0.574). While, other items; educational level, maternal family history of diabetes mellitus and sweets/cake intake were not significant.

Table (3) The mean HbA1c in the pre-educated survey was 8.1, and that in the posteducated survey was 7.4 (P<0.001).

Discussion:

In spite of the short exposure time of health education, our findings suggest that the health education intervention was successful in achieving some significant changes in the lifestyles among our target population; there was a decrease in the number of smokers, increase in the intake of a healthy diet; concerning eating dates, fat intake, increase vegetable intake, diet soft drinks, and the reason for that change is the doctor's advice and more concern about their health care. This resulted in achieving a good change in the control of diabetes mellitus (mean HbA1c) in the post-educated than the pre-educated groups. Meanwhile, no significant change in the practice of exercise, and Sweets/cake intake.

Respondents in the two surveys were similar with regard to gender, age, marital status, educational level, the presence of maternal history of diabetes.

On Studying the effect of different social demographic factors of the study population on the control of diabetes mellitus, there is a significant difference between males and females; females had a lower level of knowledge regarding the different aspects of diabetes compared with males. This result is expected as males are more likely to be better educated and employed outside the home than females which may expose them more to information than females. This finding was in accordance with Kamel et a1. (1999). [13] On

studying effect of health education on the control of diabetes mellitus on elderly, our result showed that the control is significant P<0.001 for <60years, while elderly >60 is less significant (P 0.016). The reason for less control of diabetes after the age 60. Even the tight control of diabetes is not recommended as a goal at this age, many older people with diabetes are undertreated and could benefit from improved glycemic control and more aggressive management of risk factors for macrovascular disease. [14]

Most respondents had received some form of health education in the recent past and in the follow-up survey, however the recent health education was well organized, conducted by a well trained team, and directed mainly to diabetic patients.

We can say that these results are encouraging, considering that the health education intervention was of very short duration and was of limited scope and quality. A large-scale, effective and high quality health education program is likely to have much better results, such a program is expected to reduce the burden of diabetes mellitus in Saudi Arabia.

The relation between health education and health outcomes was examined in a 4-year longitudinal, observational study of 2125 adult patients with chronic medical conditions (hypertension, diabetes, recent myocardial infarction, congestive heart failure). Patient compliance after health education was associated with improvement in health outcomes in this study. [15]

Regarding the significant improvement in HbAlc in the end-line survey, it is nearly similar to that achieved by others; developing empowerment based diabetes self-management support and a randomized control trial of continuous glucose monitoring devices on HbAlc . [16,17]

This study highlights the importance of improving the communication skills and health awareness among service providers in PHC Centers, and the need to educate patients about the dangers of an unhealthy diet, danger of smoking and sedentary lifestyle. The study recorded a modest impact on regular exercise, patients' concern to decrease their body weight with clear indicators that this was associated with cost-effective intervention and health education has been provided.

The conclusion of this study is that improving the quality of health education in PHC Centers through well designed programs will improve the awareness and practices among the population in general, but particularly among patients with diabetes mellitus. Moreover, medical students should be involved in such activities of health education in the community related health problems.

Limitations:

There are several limitations in our study: Firstly; a short period of health education. Secondly; the possibility of bias in the end-line survey cannot be excluded (patients exposed to health education and/or a similar interview at the end-line is more likely to give 'adequate' answers to the questions). Thirdly; although samples at baseline and end-line were independent of each other, the possibility of overlap between the two samples cannot be ruled out. Finally, it is expected that the impact of health education intervention may have been short-lived, as observed in several other studies. [18]

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References:

1- International diabetes federation (IDF) atlas 5th edition. Available from: http://www.idf.org/diabetesatlas/5e/the-global-burden
2- Khalid A. Alqurashi, Khalid S. Aljabri, and Samia A. Bokhari. Prevalence of diabetes mellitus in a Saudi commuAljabrinn Saudi MED. 2011 Jan-Feb; 31 (1): 19–23
3- Yagob Al Mazrou, Sulieman Al-Shehri, Manahar RAO .Ministry of Health. Kingdom of Saudi Arabia: Principles and Practice of primary health care. Health Education 2002; p 14-17
4- World Health Organization. Annual global movement for health initiative: A Concept Paper. Geneva (Switzerland): WHO; 2003. Available from URL: http//: www.who.int. /Moveforhealth/publication/en/mfh_concept_paper_english_pdf
5- American Diabetes Association. Standards of Medical Care for Patients with Diabetes Mellitus. Diabetes Care 2003; 26 (Suppl 1): S33-S50
6- Chopra M, Galbraith S, Darnton-Hill I. A global response to global problem: the epidemic of overnutrition. Bull World Health Organ 2002; 80: 952-958.
7- Muhammad Umair Khan. Lifestyle Modification in the Prevention of TIIDM. DOI 10.5001/omj. 2012;36
8- Yagob Al Mazrou, Sulieman Al-Shehri, Manahar RAO .Ministry of Health. Kingdom of Saudi Arabia: Principles and Practice of primary health care. Health Education 2002; p. 101.
9- The global diabetes community. Diabetic Co.UK. Available from: http://www.diabetes.co.uk/what-is-hba1c.html
10- Standards of Medical Care in Diabetes—2009. Diabetes Care January 2009 32: S6-S12; doi: 10.2337/dc09-S006 Living with diabetes. ADA. Available from: http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-glucose-control/a1c/
11- NICE clinical guideline 66. The management of type 2 diabetes. Issue date: May 2008. Available from www.nice.org.uk/nicemedia/pdf/CG66NICEGuideline.pdf
12- Almoutaz Alkhier Ahmed. Glycemic Control in Diabetes. Oman Medical Journal 2010, Volume 25, Issue 3, July 2010.
13- Kame1 NM, Badawy YA, el Zeiny NA, Merdan IA. Sociodemographic determinants of management behavior of diabetic patients. Part I. Behavior of patients in relation to management of their disease. East Mediterr Health J. 1999 Sep; 5 (5): 967-73.
14- Jeffrey I. Wallace.Management of Diabetes in the Elderly, CLINICAL DIABETES, VOL. 17 NO. 1 1999. Available from: http://journal.diabetes.org/clinicaldiabetes/v17n11999/Pg19.htm
15- Health education and health outcomes, 4-year longitudinal, observational study of 2125 adult patients with chronic medical conditions, Journal of behavioral medicine, volume 17, No 4, 1994
16- Funnel1 MM, Tang TS. From DSME to DSMS: Developing empowerment based diabetes self-management support. Diabetes Spect. 2007; 20:2214.
17- Steven J, Stanton P, Newman, Cooke D, Steed E, Nunn A, et al. A randomized control trial of continuous glucose monitoring devices on HbAlc - The MITRE Study. 67th Scientific American Diabetes Association Meeting, 2007.
18- B C K Choi et al[23]. Evidence-based public health policy and practice. J Epidemiol Community Health 2008;62:391-397 doi:10.1136/jech.2007.060368.

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Table I: Percentage demographic distribution of respondents.

Respondent characteristic		Baseline survey 50.8% (N=431)	Follow-up survey 41.8% (N=418)	*P*-value*
Gender	Male	50.7	51.1	0.496
	Female	49.3	48.9	
Age group/yr	≤60	51.4	48.6	0.257
	>60	48.4	51.6	
Marital status	Single	2.1	3.1	0.803
	Married	90	89.2	0.803
	Divorced	3	2.6	0.744
	Widow	4.9	5	
Educational level	Low	54.1	54.5	0.411
	Middle	24.1	20.8	0.410
	High	21.8	24.6	0.834
Family history	Maternal only	38.1	40.9	0.466
Received Health education		82.4	87.8	0.017

**p*-values indicate the statistical significance of differences between baseline and follow-up surveys calculated through chi-squared test

Table II: Percentage of respondents, controlled Diabetes Mellitus before and after the health education intervention.

No	Controlled Diabetes Mellitus HbA1c < 7%				P value
	Item		Phase I	Phase II	
1.	Gender	Male	19.8	46.7	<0.001
		Female	34.7	45.8	0.002
2.	Age	≤60	42.5	57.8	<0.001
		>60	36.1	63.9	0.016
3.	Education	Low	54.1	54.5	0.411
		Middle	24.1	20.8	0.410
		High	21.8	24.6	0.834
4.	Maternal F/H DM	Yes	49.1	50.9	0.245
5.	Practice sports	Yes	39.9	44.7	0.109
6.	Smoke	Not smoking	30.9	45.9	<0.001
7.	Healthy diet	Yes	29.4	54.6	<0.001
8.	Dates ≤7/day	Yes	29.4	41.9	0.003
9.	Sweets & cakes	Yes	33	44	0.085
10.	Fats	Yes	29.4	50.5	<0.001
11.	Vegetables	Yes	30.8	50.8	<0.001
12.	Diet drinks	Yes	26	54.9	<0.001
13.	Reason for change	Doctor advice	48.7	51.3	<0.001
		Weight	23.1	76.9	0.574
		Health care	28.1	71.9	<0.001

*p-values indicate the statistical significance of differences between baseline and follow-up surveys calculated by chi-squared test,

Table III: HbA1c measurements in the Studied group Before and After health education

	Study phase	N	Mean	Std. Deviation	*P*-value*
HbA1 C	Pre educate	425	8.1	(1.65)	<0.001
	Post educate	415	7.4	(1.34)	

*p-values indicate the statistical significance of differences between baseline and follow-up surveys calculated through an independent sample T test.